WEST VIRGINIA INTEGRATED BEHAVIORAL HEALTH CONFERENCE

This is Your Brain on Adolescence

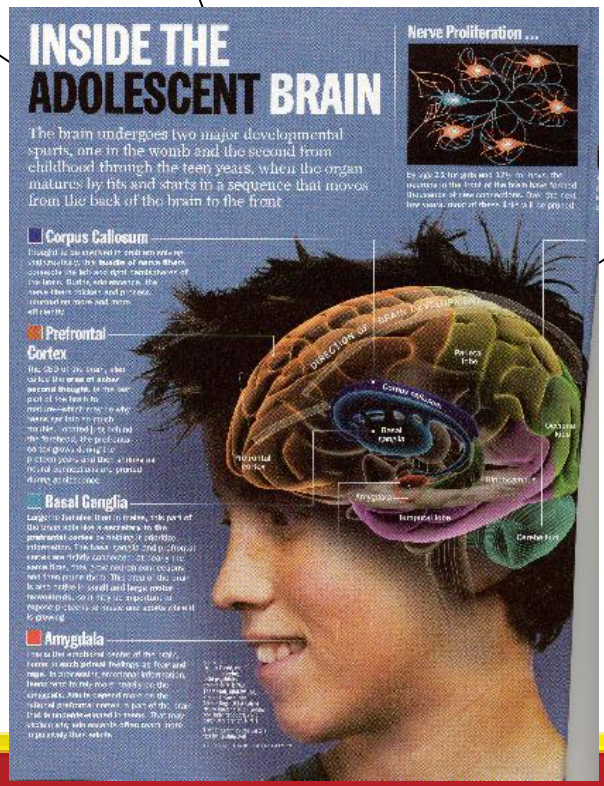
Ken Winters, Ph.D., Dept. of Psychiatry, University of Minnesota

WEST VIRGINIA Department of Health & Human Resources

BUREAU FOR BEHAVIORAL HEALTH AND HEALTH FACILITIES
350 Capitol Street, Room 350
Charleston, WV 25301
304-558-0627

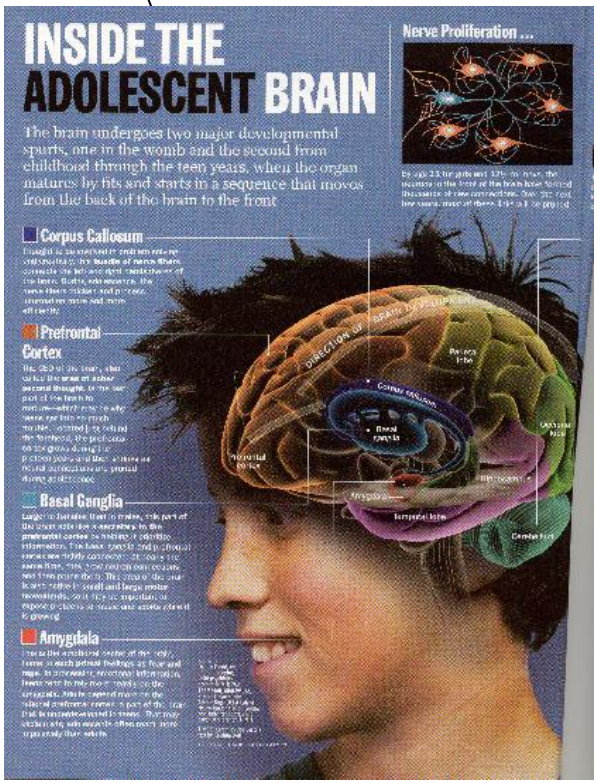
1. Brain development – elaboration

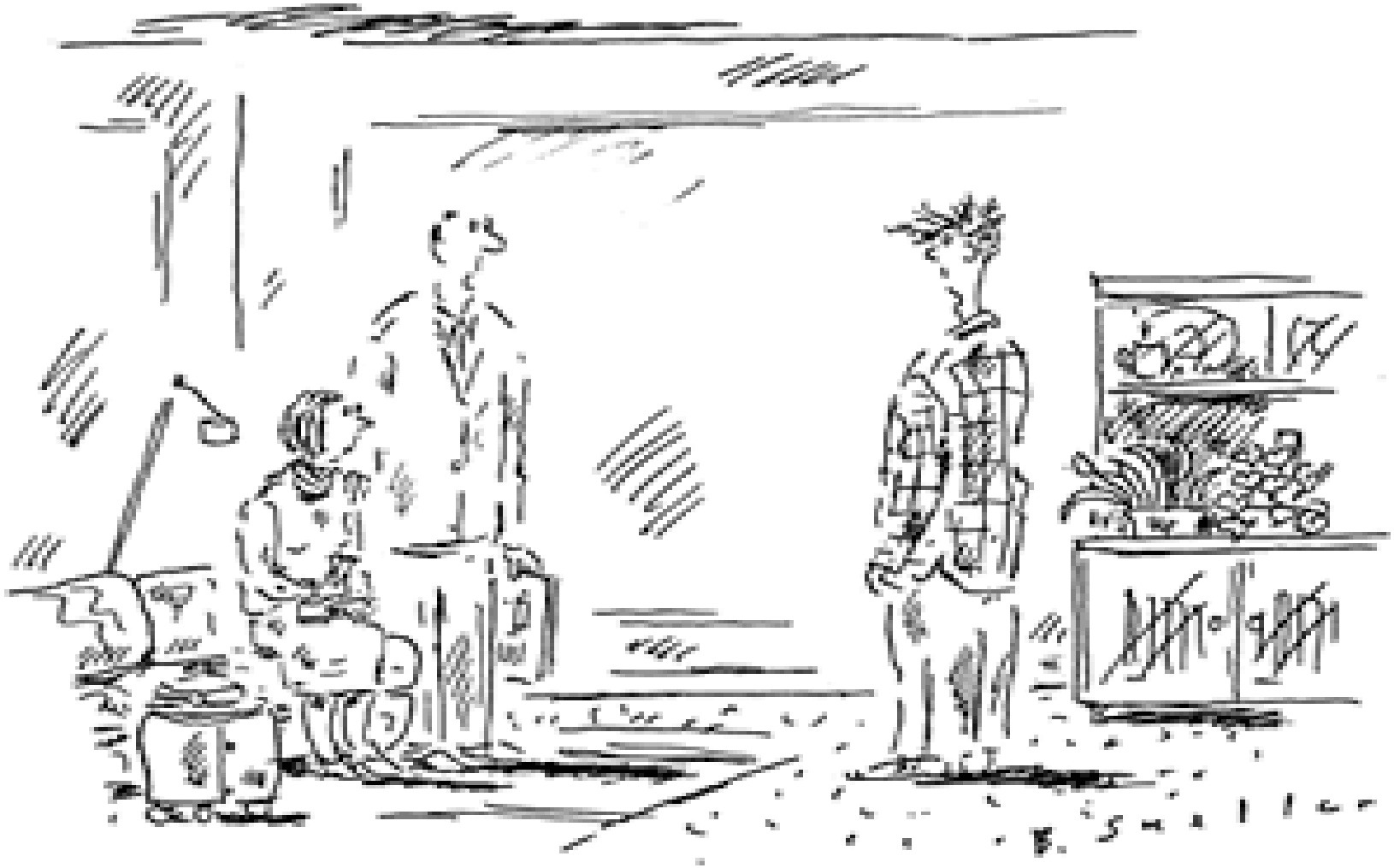
3. Social & clinical implications



2. Marijuana

1. Brain development – elaboration

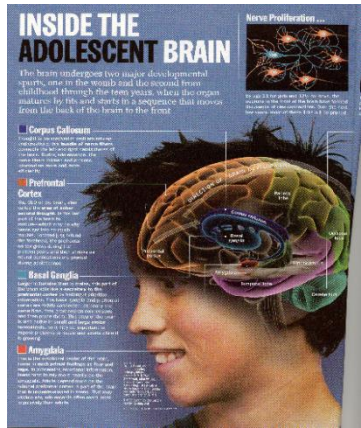




"Young man, go to your room and stay there until your cerebral cortex matures."

Implications of Brain Development for Adolescent Behavior

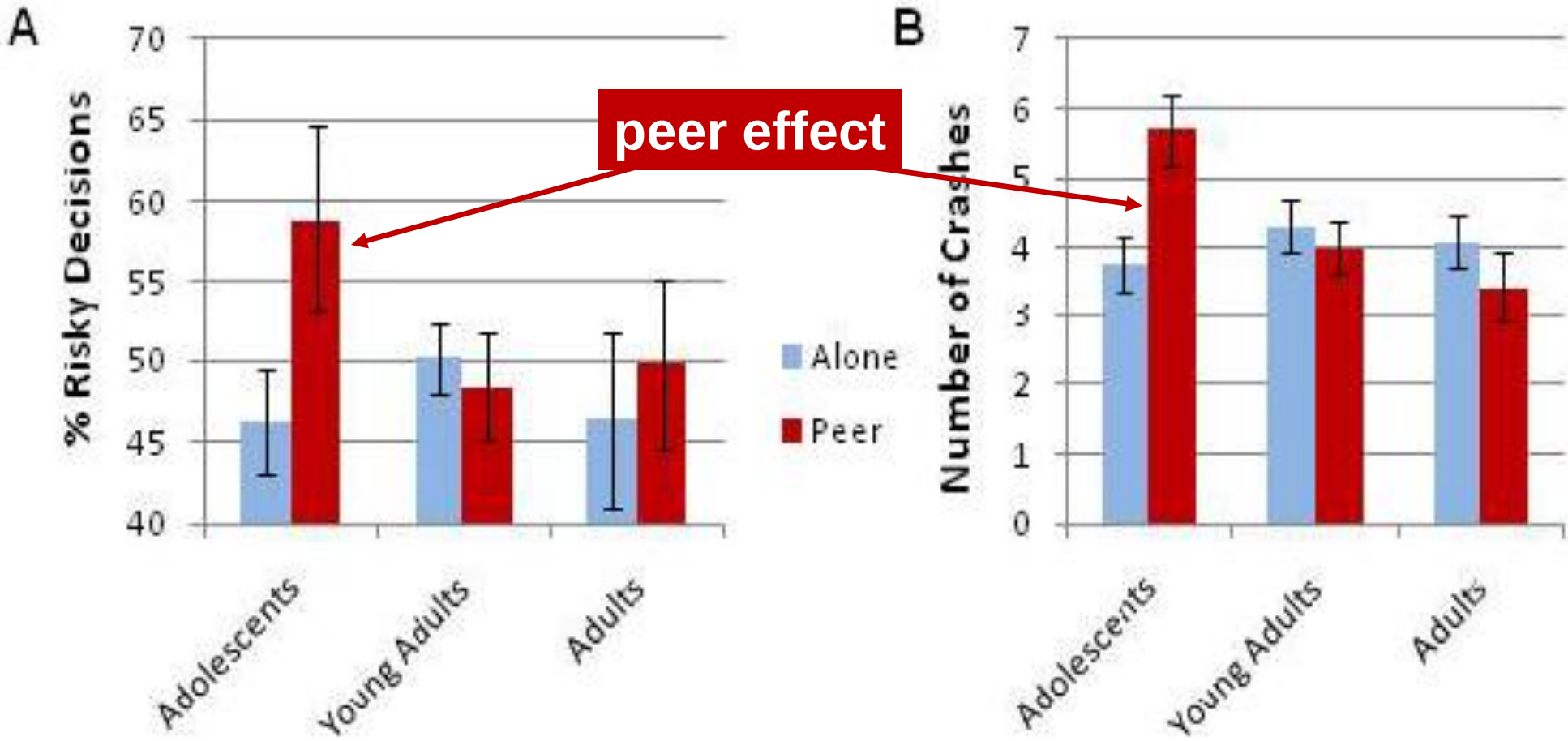
- **Preference for ….**
  1. physical activity
  2. high excitement and rewarding activities
  3. activities with peers that trigger high intensity/arousal
  4. novelty
- **Less than optimal..**
  5. control of emotional arousal
  6. consideration of negative conseq.
- **Greater tendency to…**
  7. be attentive to social information
  8. take risks and show impulsiveness



Risk-Taking

- **Based on science of brain development, a modern view of risk taking in adolescence is…**
  - **normative; important to development**
  - **evolutionarily adaptive**
  - **significant individual differences**
  - **is due primarily to <u>emotional and contextual</u>, not cognitive, factors**

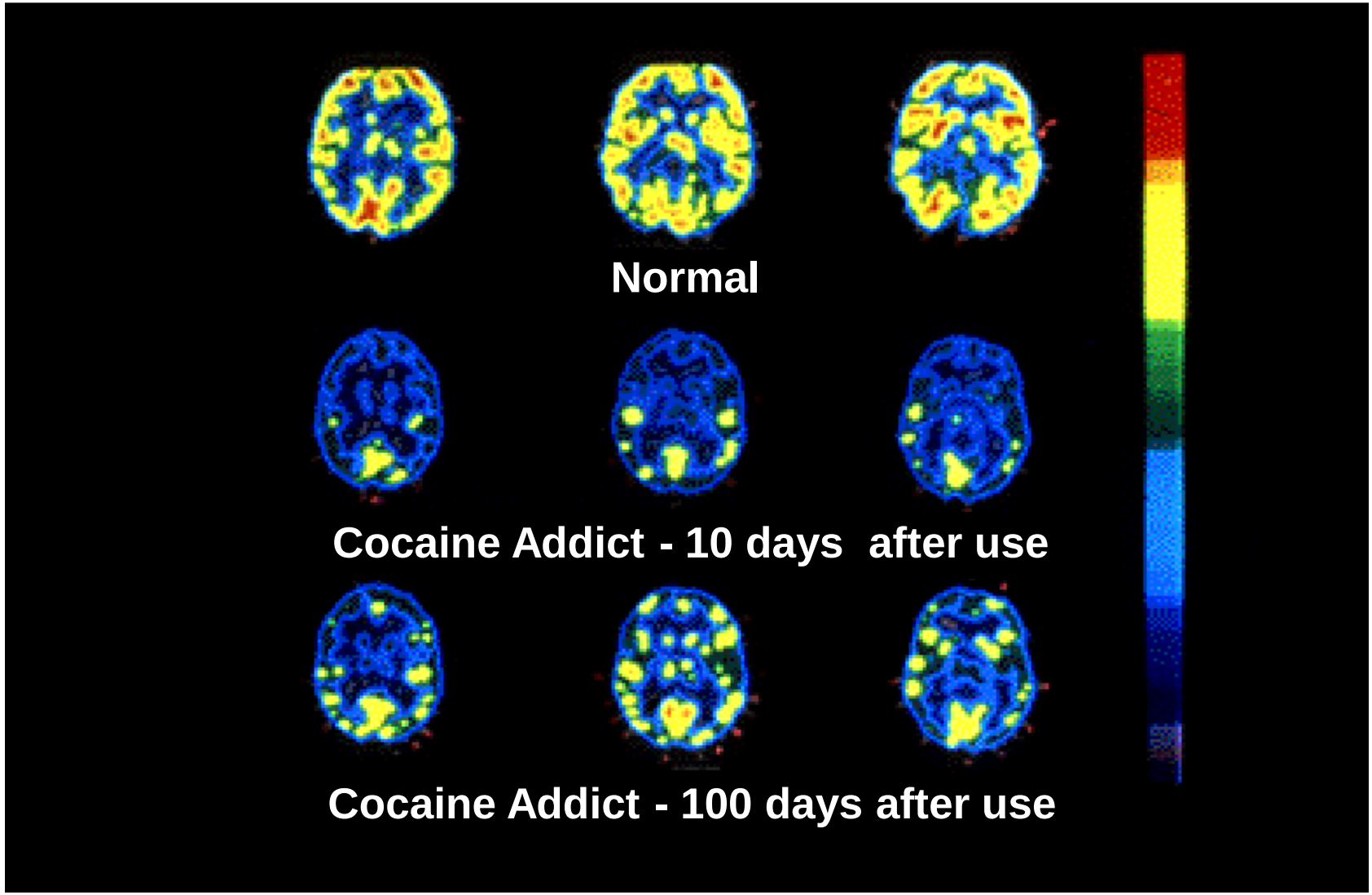
Impact of Peer Presence on Risky Driving in Simulated Context



Chein et al., in press

What about recovery?

Your Brain After Cocaine

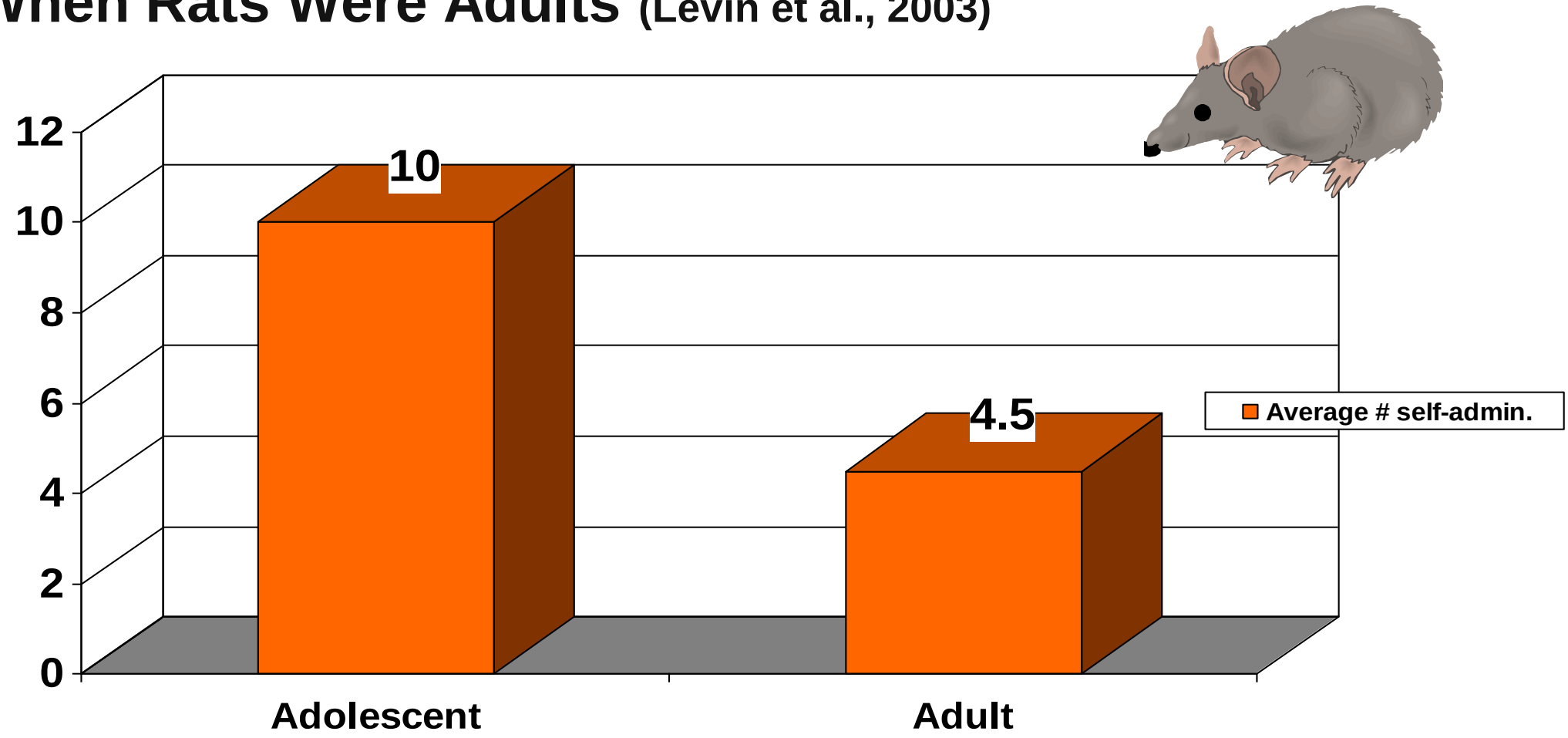


Yellow = normal brain functioning

“Priming the Pump” Theory

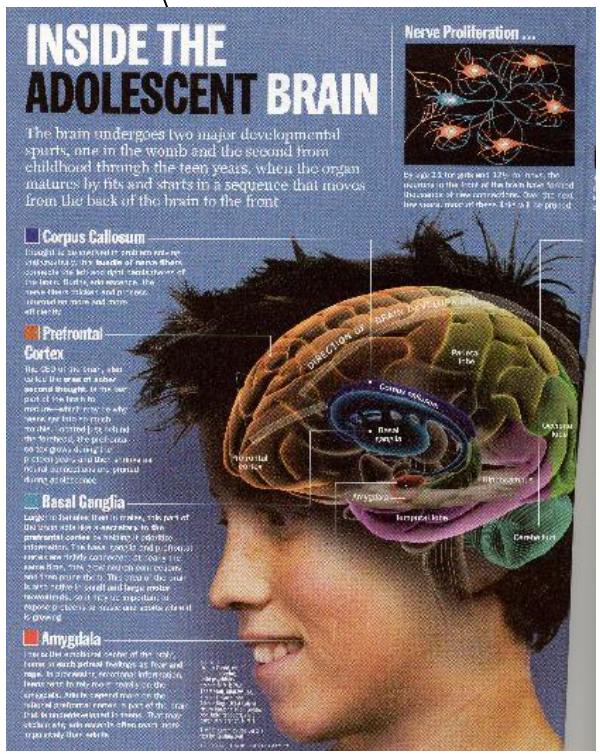
- **Does early exposure to drugs alter the brain in ways that affect recovery that are unique to youth?**

Average Number of Self-Administered Doses of Nicotine When Rats Were Adults (Levin et al., 2003)



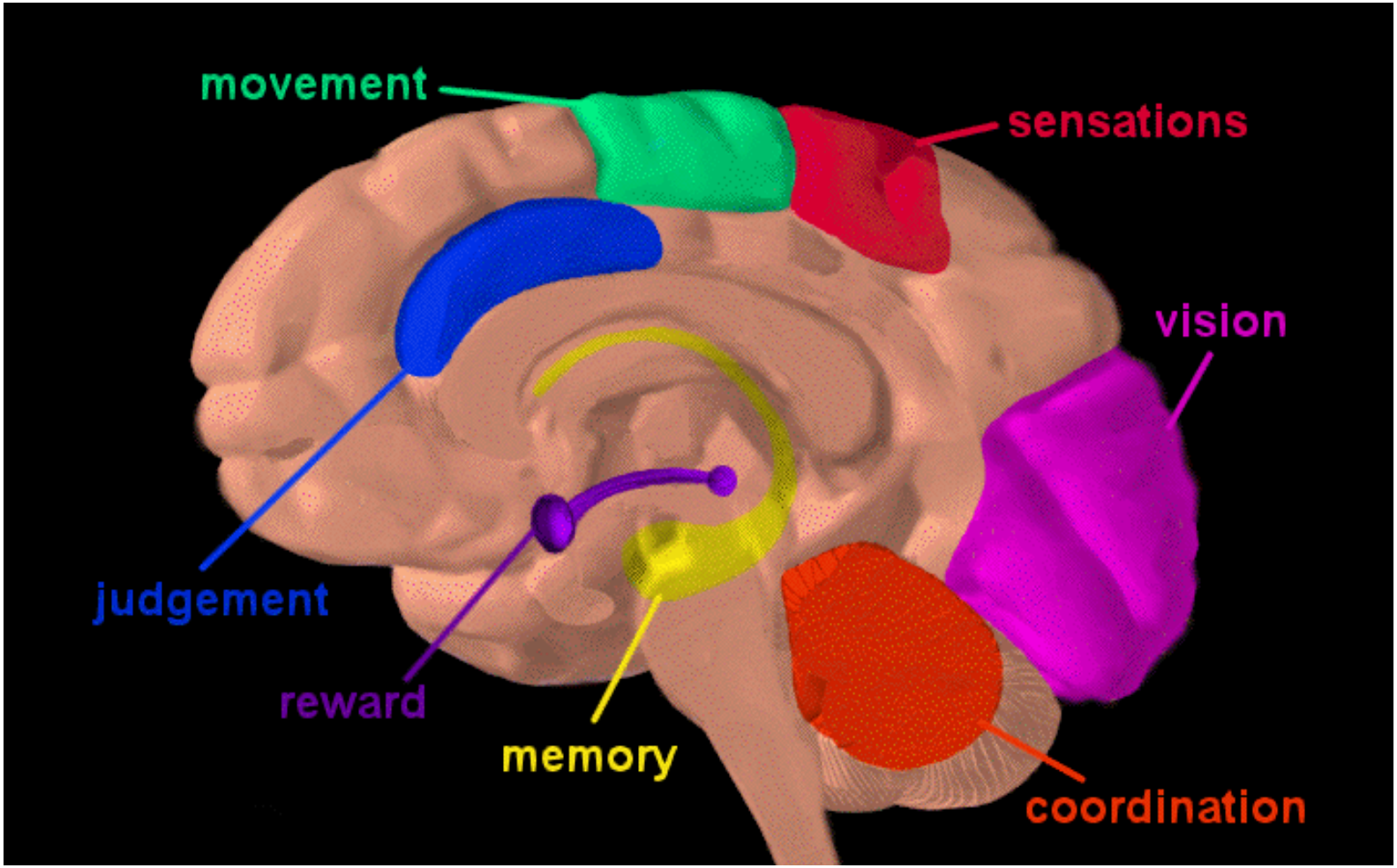
Age of Rates When First Exposed to Nicotine. All Data Collected When Rats were Adults.

1. Brain development



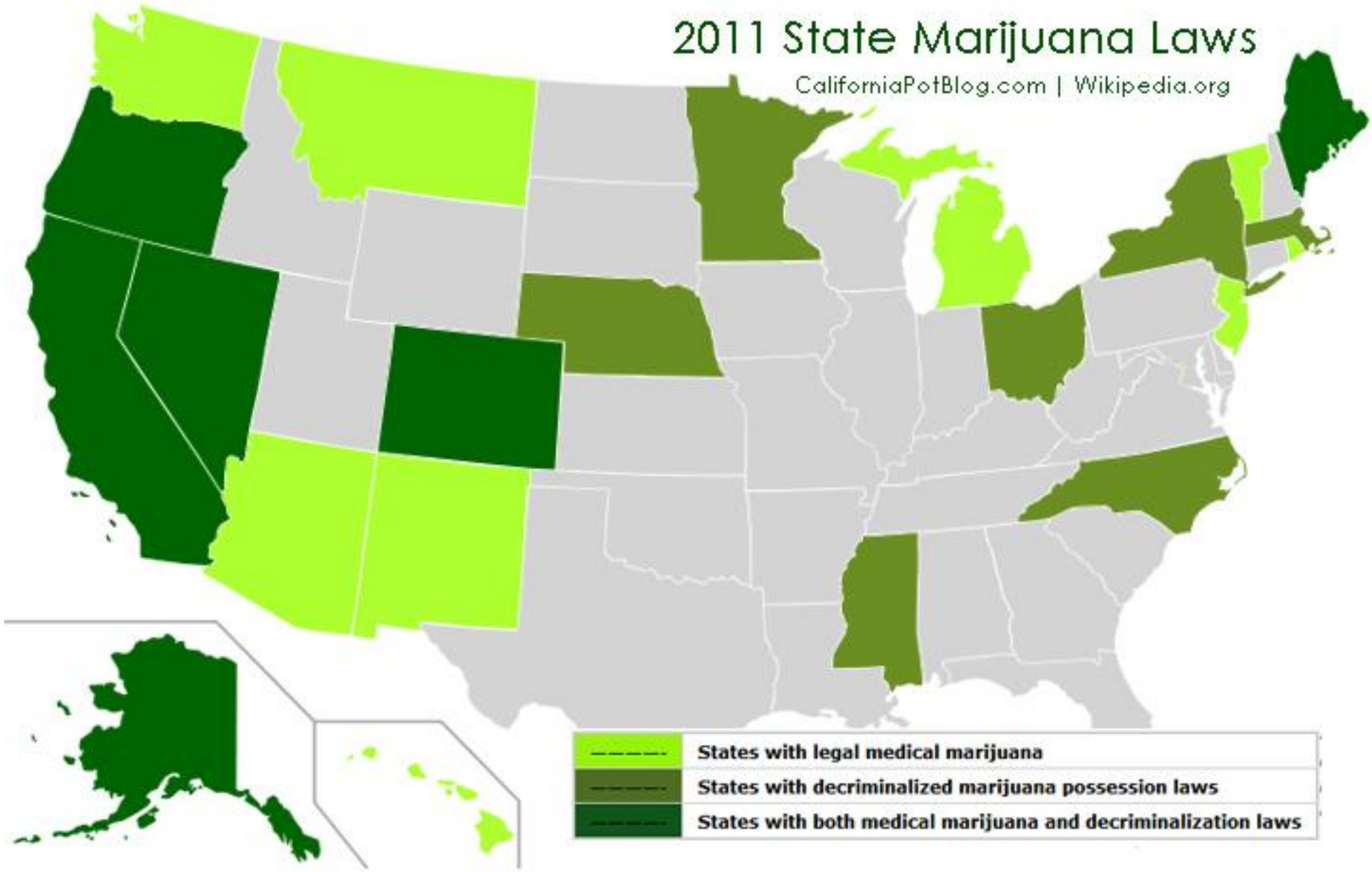
2. Marijuana

What's Affected by Marijuana?



Adverse Effects

- Decreased coordination and reaction time
- Impaired ability to concentrate
- Impaired memory and learning ability


2011 State Marijuana Laws
CaliforniaPotBlog.com | Wikipedia.org
States with legal medical marijuana
States with decriminalized marijuana possession laws
States with both medical marijuana and decriminalization laws

Cannabis and progression to other substance use in young adults: Findings from a 13-year prospective population-based study (Swift et al., 2010)

- **13-year longitudinal cohort study with recruitment in secondary school students in Victoria, Australia.**
- **There were six waves of adolescent data collection (mean age 14.9 - 17.4 years) followed by three in young adulthood (mean age 20.7, 24.1 and 29.0 years).**
- **Never use of marijuana provided the strongest protection from use of all other drugs;**
- **Weekly cannabis users during adolescence had two to three times the rates of illicit drug use uptake during young adulthood, while daily users had six times the rate of uptake of cigarette smoking.**

Major New Study Shows Heavy Marijuana Use Lowers IQ

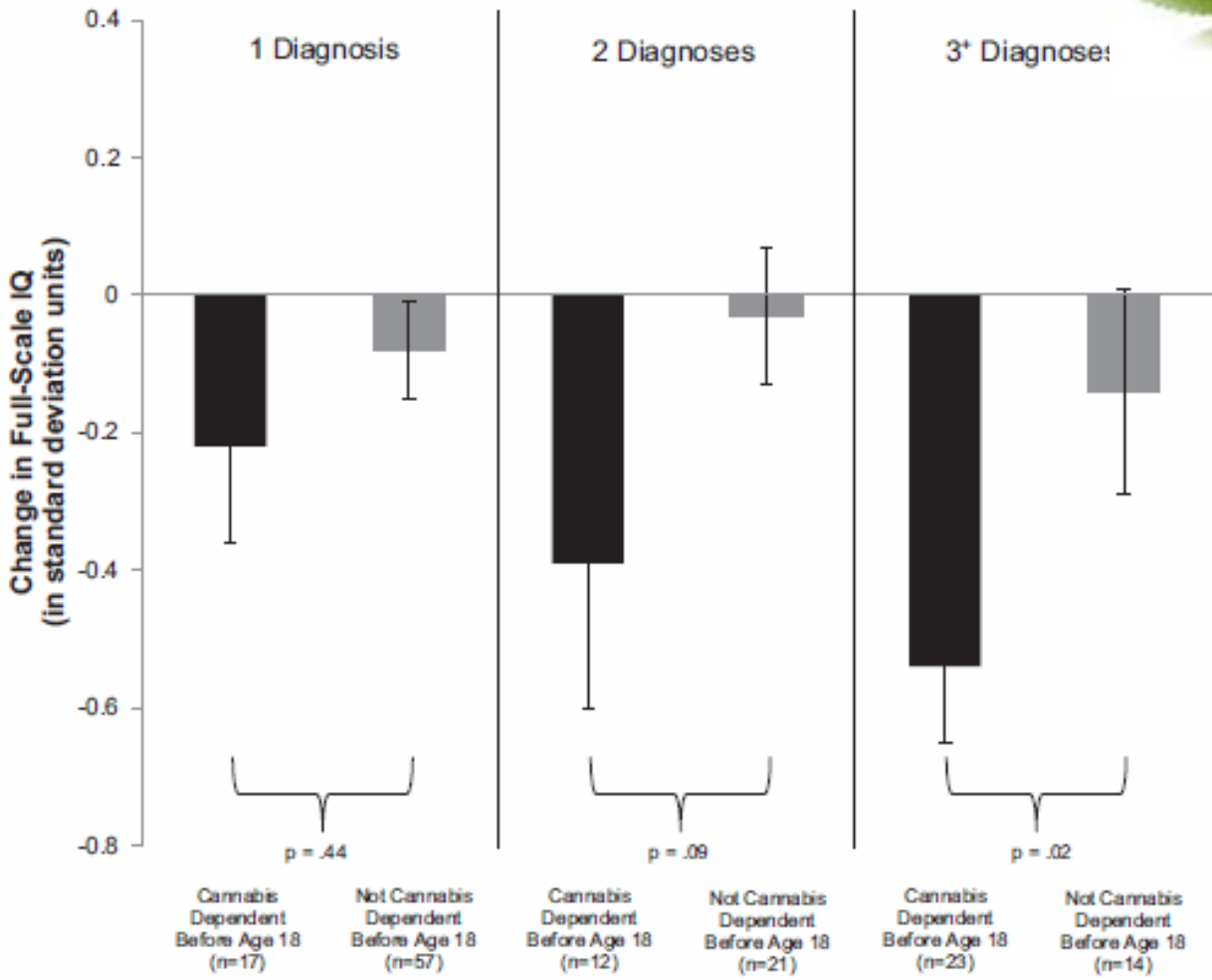
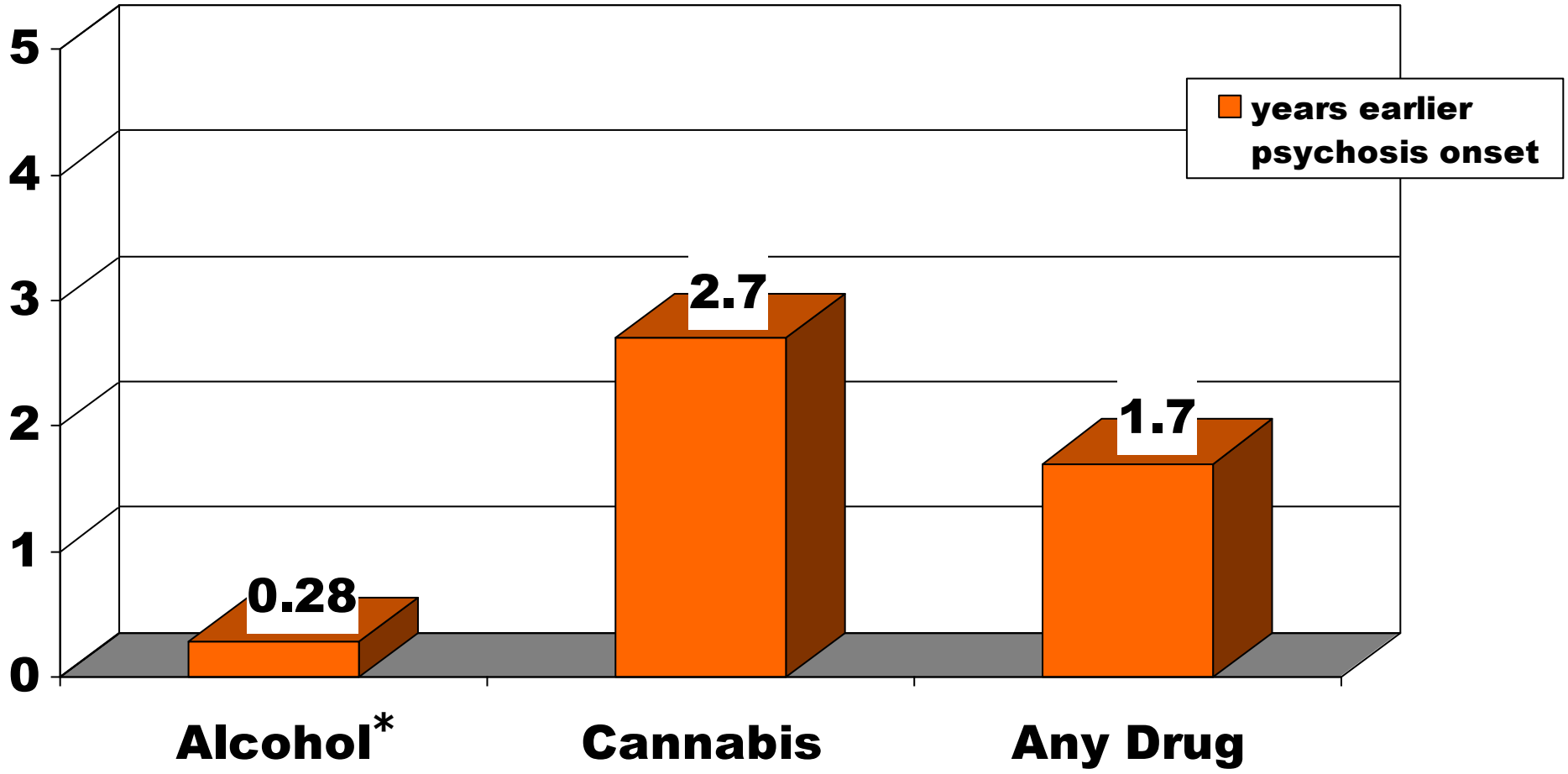


Fig. 2. Adolescent vulnerability. Shown is change in full-scale IQ (in SD units) from childhood to adulthood among study members with 1, 2, or 3+ diagnoses of cannabis dependence as a function of age of onset of cannabis dependence. Individuals with adolescent-onset cannabis dependence (black bars) experienced greater IQ decline than individuals with adult-onset cannabis dependence (gray bars). IQ decline of approximately –0.55 SD units among individuals with adolescent-onset cannabis dependence in the 3+ group represents a decline of 8 IQ points. Error bars = SEs.

Meier et al., 2012; *PNAS*

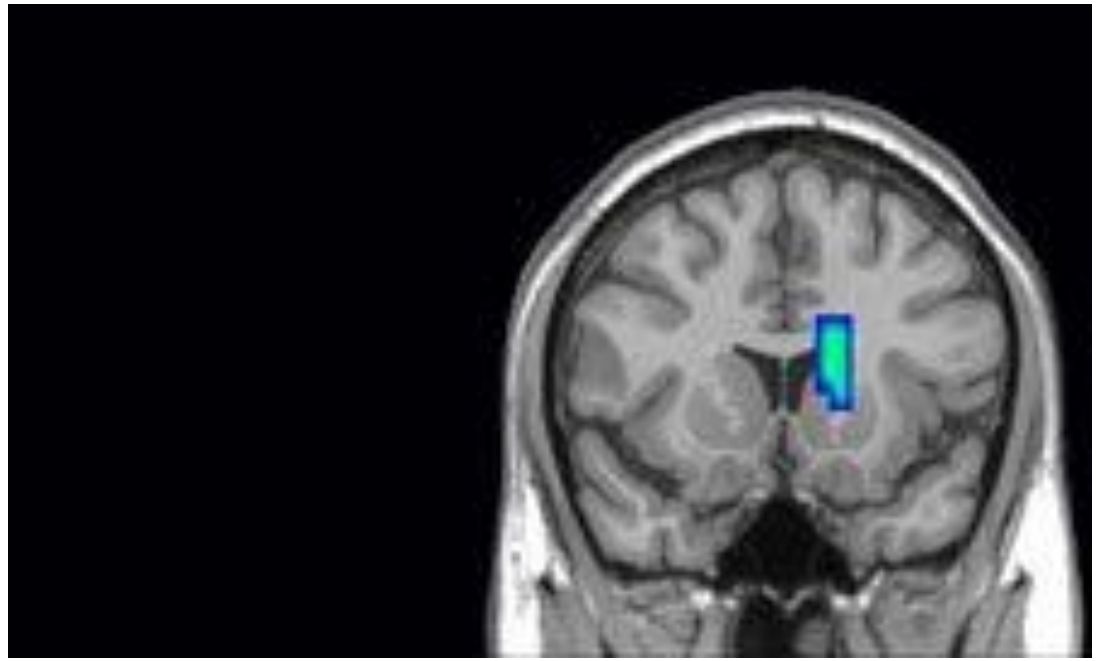
Drug Use and Age at Onset of Psychosis Based on a Meta-Analysis (Large et al., 2011)



mean years earlier of age at onset of psychosis compared to non-drug using controls

* = nonsig. with controls

Psychosis: THC decreases the normal activation in the striatum (blue area)



THC significantly weakened the activation of the striatum and increased the activation of the lateral prefrontal cortex. The effect in the striatum was a result of THC increasing individuals' response to normally insignificant stimuli, and decreasing its response to significant stimuli. The findings help explain why smoking cannabis can result in feelings of paranoia, or in the most extreme cases, psychotic episodes, as individuals attach special importance or meaning to normally insignificant experiences or stimuli.

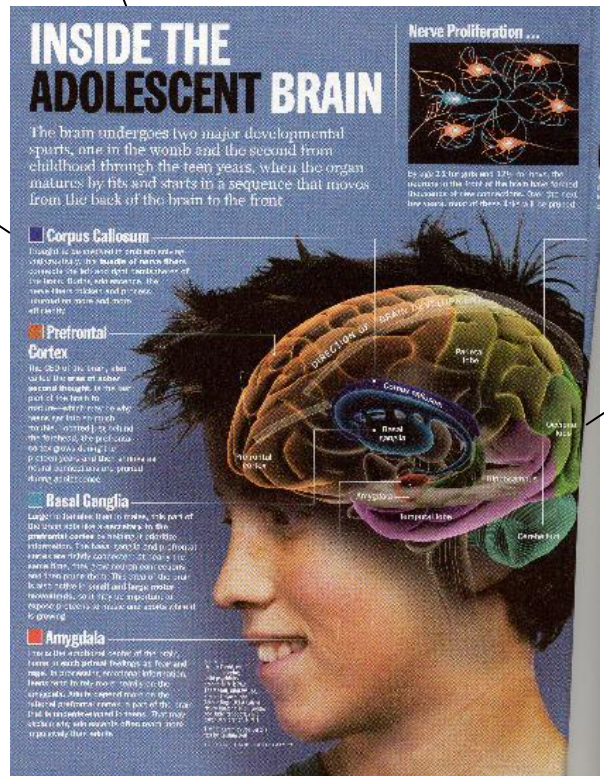
Myth Buster

Teens often advance several pro-marijuana arguments. Among the following, which are myths? Which are facts?

1. **Marijuana is not addictive. M or F?**
2. **Marijuana is medicine. M or F?**
3. **Smoking marijuana does not weaken lung capacity. M or F?**
4. **Alcohol contributes to aggression and violence; marijuana does not. M or F?**
5. **You can not overdose from marijuana. M or F?**

1. **Brain development – elaboration**

3. **Social & clinical implications**



2. **Marijuana**

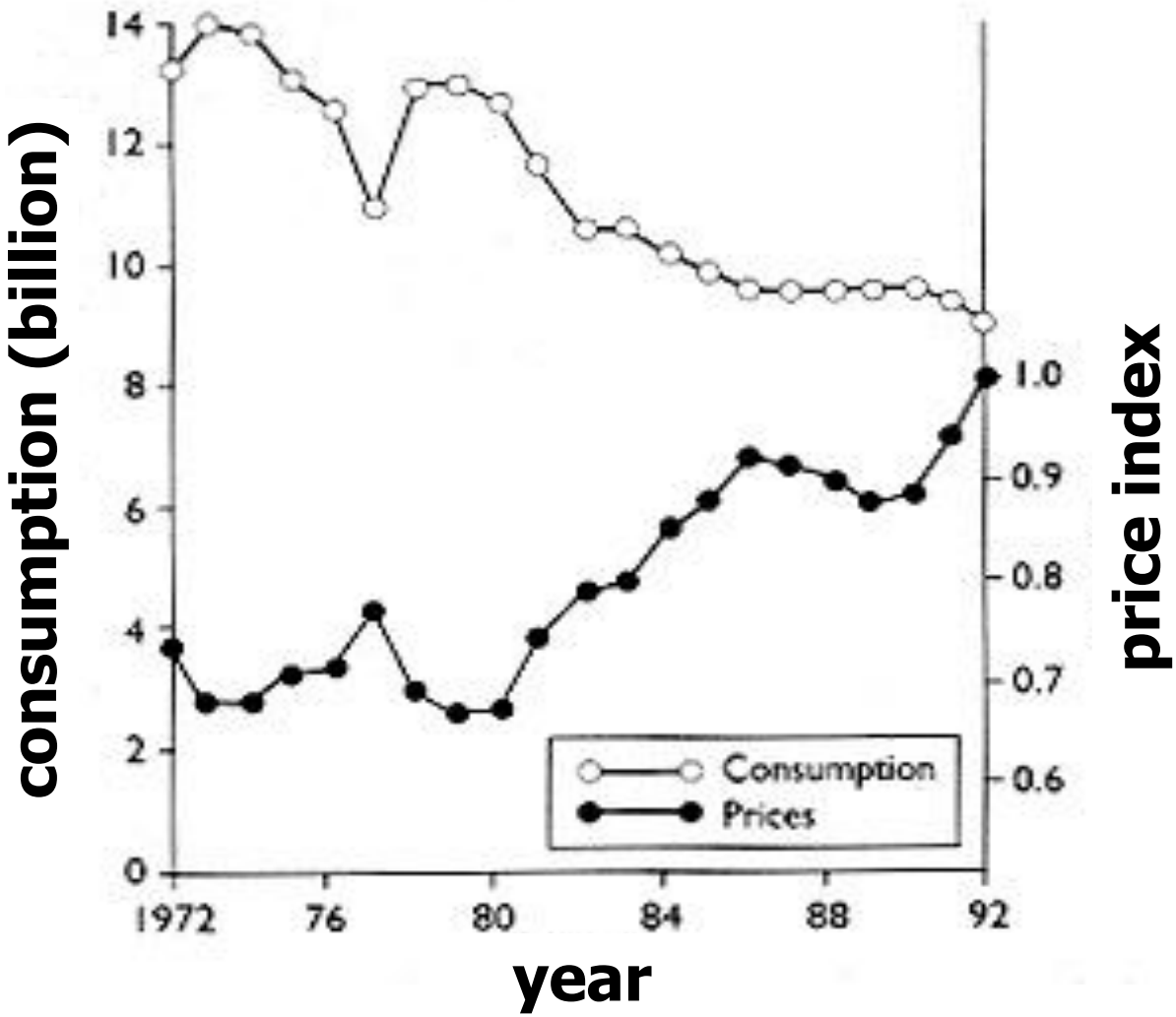
Social & Clinical Implications

- **Social/Environmental**
- **Self-regulation skills**
- **Counseling**
- **Parenting**

Implications for Interventions

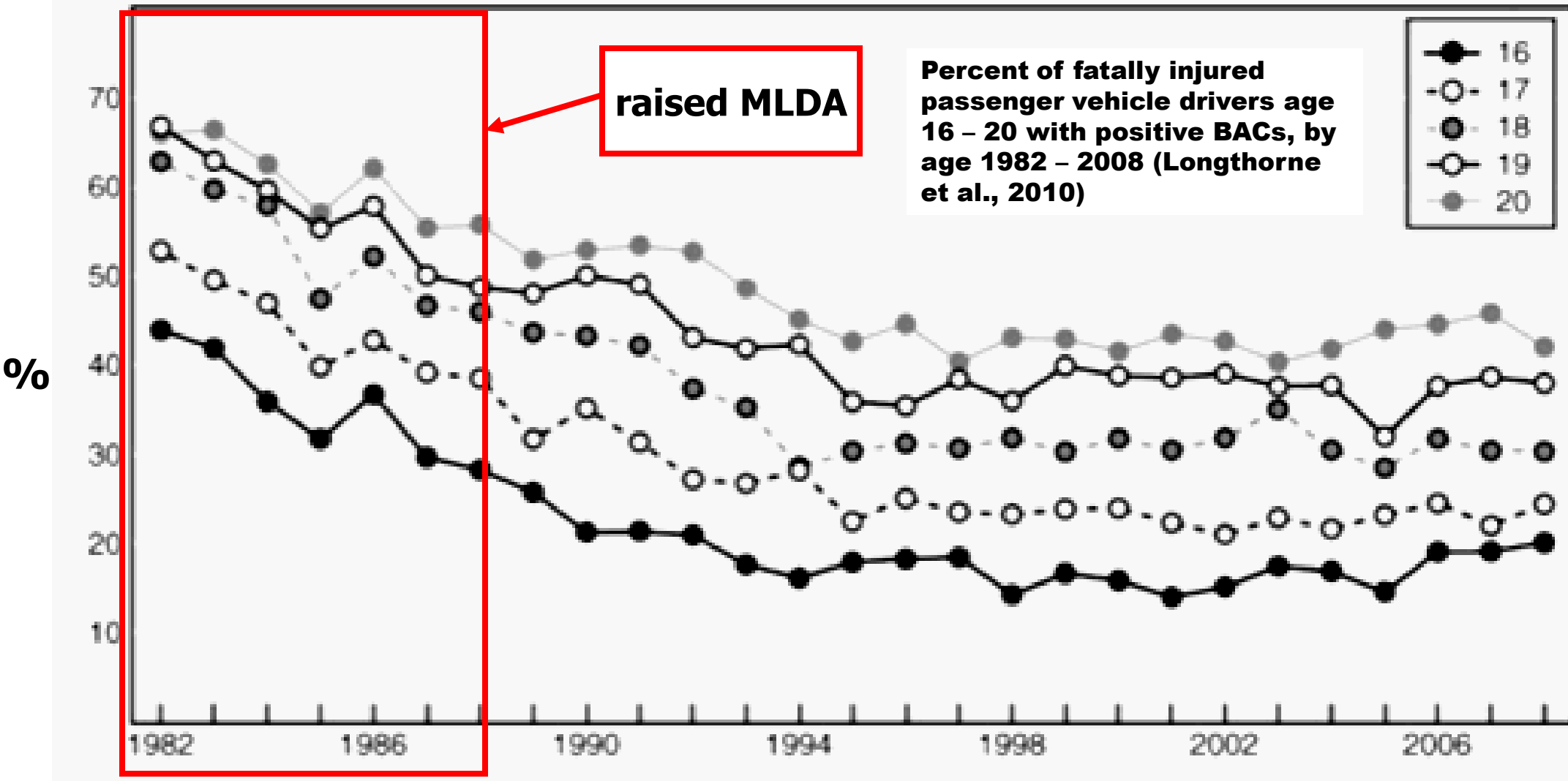
- **Social/Environmental**
- Self-regulation skills
- Counseling
- Parenting

Smoking and Price: Relation Between Cigarette Consumption and Adjusted Price During 1972-92



Townsend J et al. BMJ 1994;309:923-927

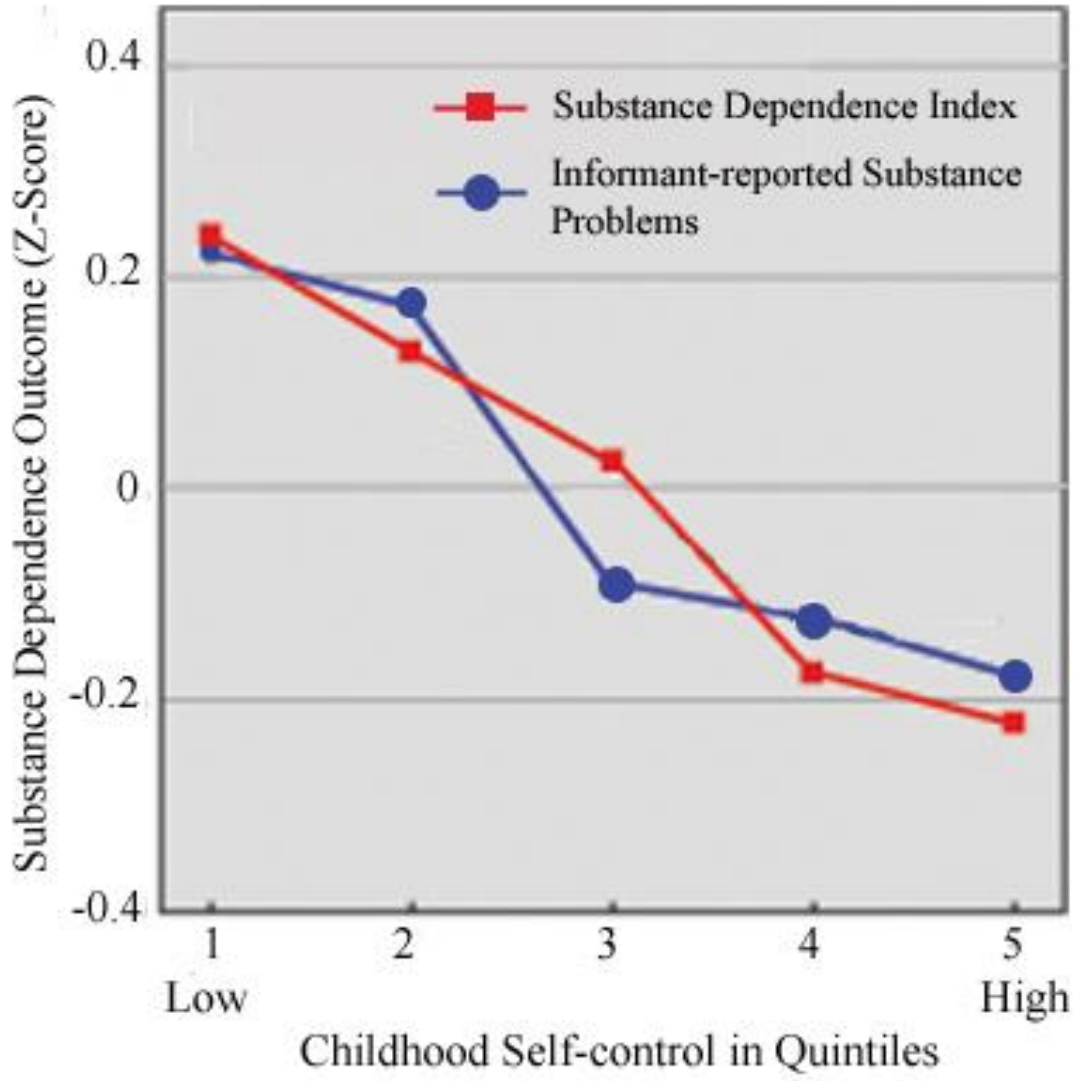
Minimum Legal Drinking Age (MLDA) and Vehicle Fatalities Among Young Drivers (16 – 20)



Implications for Interventions

- Social/Environmental
- **Self-regulation skills**
- Counseling
- Parenting

Childhood Self-control as a Predictor of Adult Substance Use Dependence (Moffitt et al., in press)



Outcomes were converted to Z-Scores and childhood self-control is represented in quintiles.

Implications for Interventions

- **Many preventive interventions do not take full advantage of this new science.**
- **Most programs focus on the standard view of risk and protective factors**
  - **See reviews (Winters et al., 2007; National Registry of Effective Programs and Practices)**
- **Rays of hope:**
  - **Botivn's *Life Skills***
  - ***MET-CBT-5***

A Way Forward:
Capitalizing on Neuroscience

- Teaching important skills not optimal for the teen brain
  - impulse control
  - "second" thought processes
  - social decision making
  - dealing with risk situations
  - taking healthy risks

Better Decision Making
Improving Executive Functioning

- **Some people think through a situation before they make a decision regarding their next step, while others just do what comes first or is easiest, regardless of the consequences (i.e. act first, think later.**
- **Consider this.**
  - **Red light: "Stop. Do not act or say anything yet."**
  - **Yellow light: "Consider options. Review them."**
  - **Green light: "Choose an option. Review how it went."**

Implications for Interventions

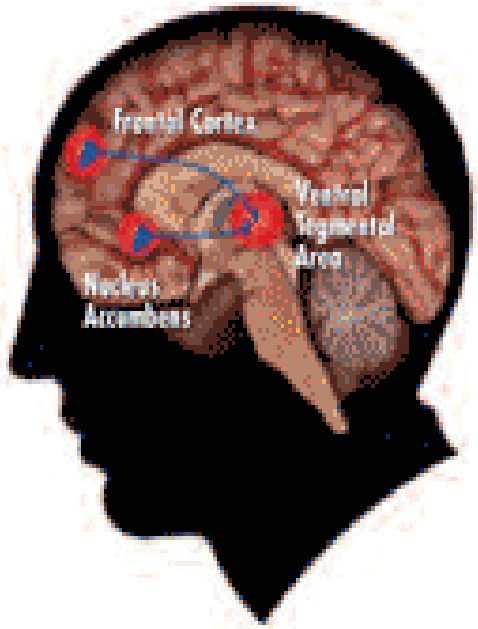
- Social/Environmental
- Self-regulation skills
- **Counseling**
- Parenting

Brain Development: Opportunities for Prevention and Treatment

- Discuss with teenagers the science of the neurobiology of addiction

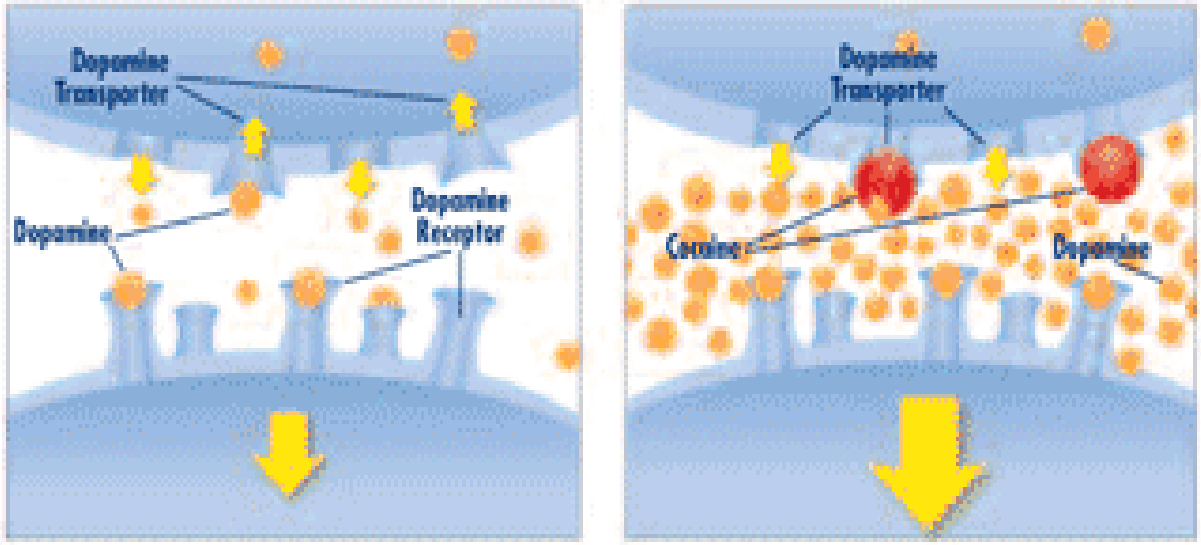
ALL DRUGS OF ABUSE TARGET THE BRAIN'S PLEASURE CENTER

Brain reward (dopamine) pathways



These brain circuits are important for natural rewards such as food, music, and art.

All drugs of abuse increase dopamine



FOOD

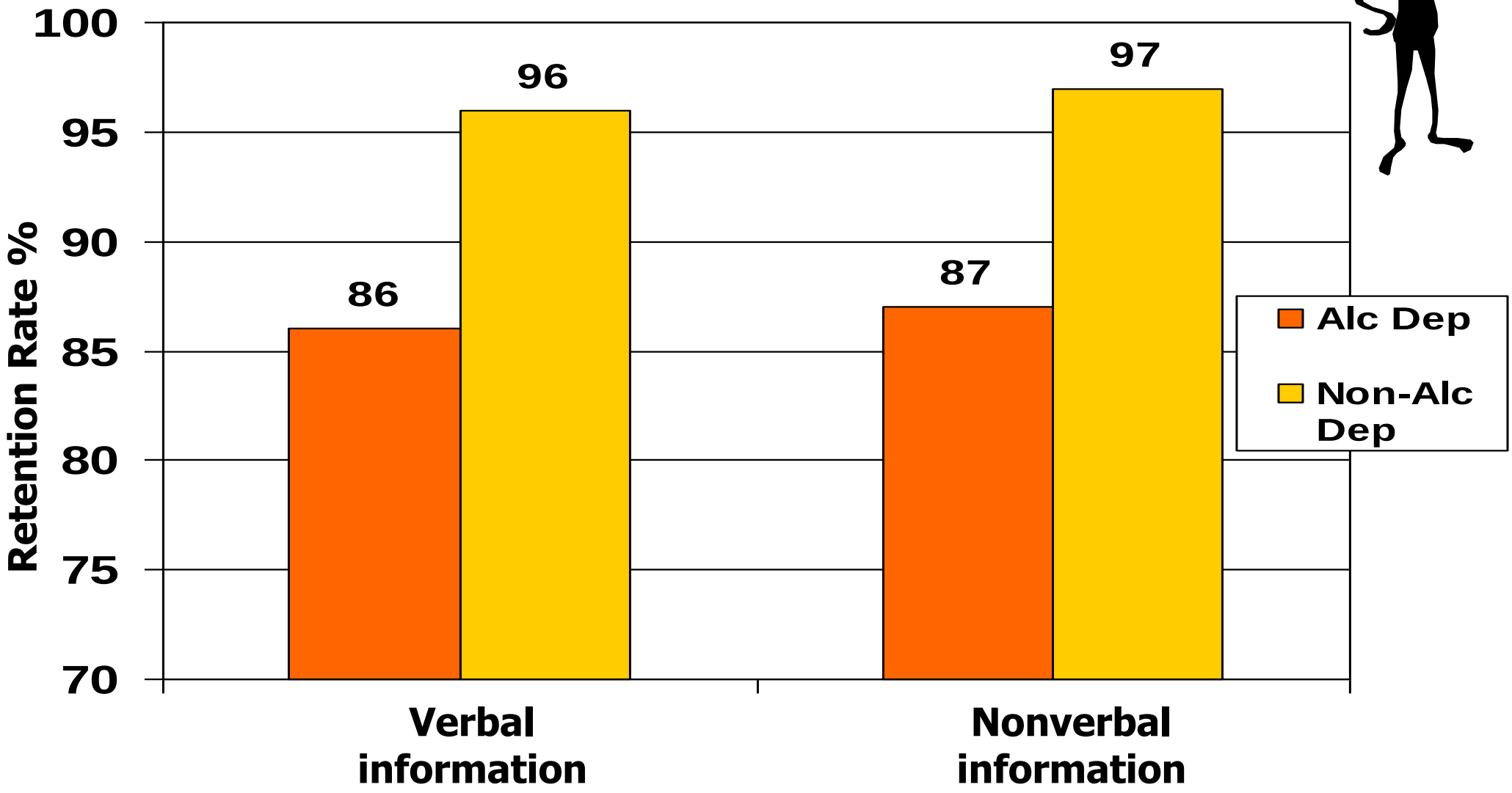
COCAINE

Typically, dopamine increases in response to natural rewards such as food.
When cocaine is taken, dopamine increases are exaggerated, and communication is altered.

Brain Development: Opportunities for Prevention and Treatment

- **Discuss the implications of using substances when the brain is still developing.**

Memory Effects



Source: Brown et al., 2000

Classroom Resources

- **There are now some age-appropriate resources to educate youth about their developing brain.**

  - **Resource from BSCS**
    Drug Abuse, Addiction and the Adolescent Brain
    (www.BSCS.org)

  - **Hazelden has published an 8-lesson multi media resource: *Drugs and the Developing Brain***
    (www.hazelden.org)

Brain Development: Opportunities for Treatment

- Two major treatment approaches seem accommodating to the teen brain:
  - Cognitive – behavioral therapy (CBT)
  - Motivational interviewing

Characteristics of CBT

- **Focus on immediate, relevant and specific problems**

- **Solutions are realistic, concrete, specific**

Characteristics of Motivational Interviewing

- De-emphasize labels
- Emphasis on personal choice and responsibility
- Therapist focuses on eliciting the client's own concerns
- Resistance is met with reflection and non-argumentation
- Treatment goals are negotiated; client’s involvement is seen as vital

Five principles of motivational interviewing

- Express Empathy
- Avoid Argumentation
  - Light confronting may be needed
- Roll with Resistance
- Support Self-efficacy
- Develop Discrepancy

(Miller and Rollnik)

Brain Development: Opportunities for Treatment

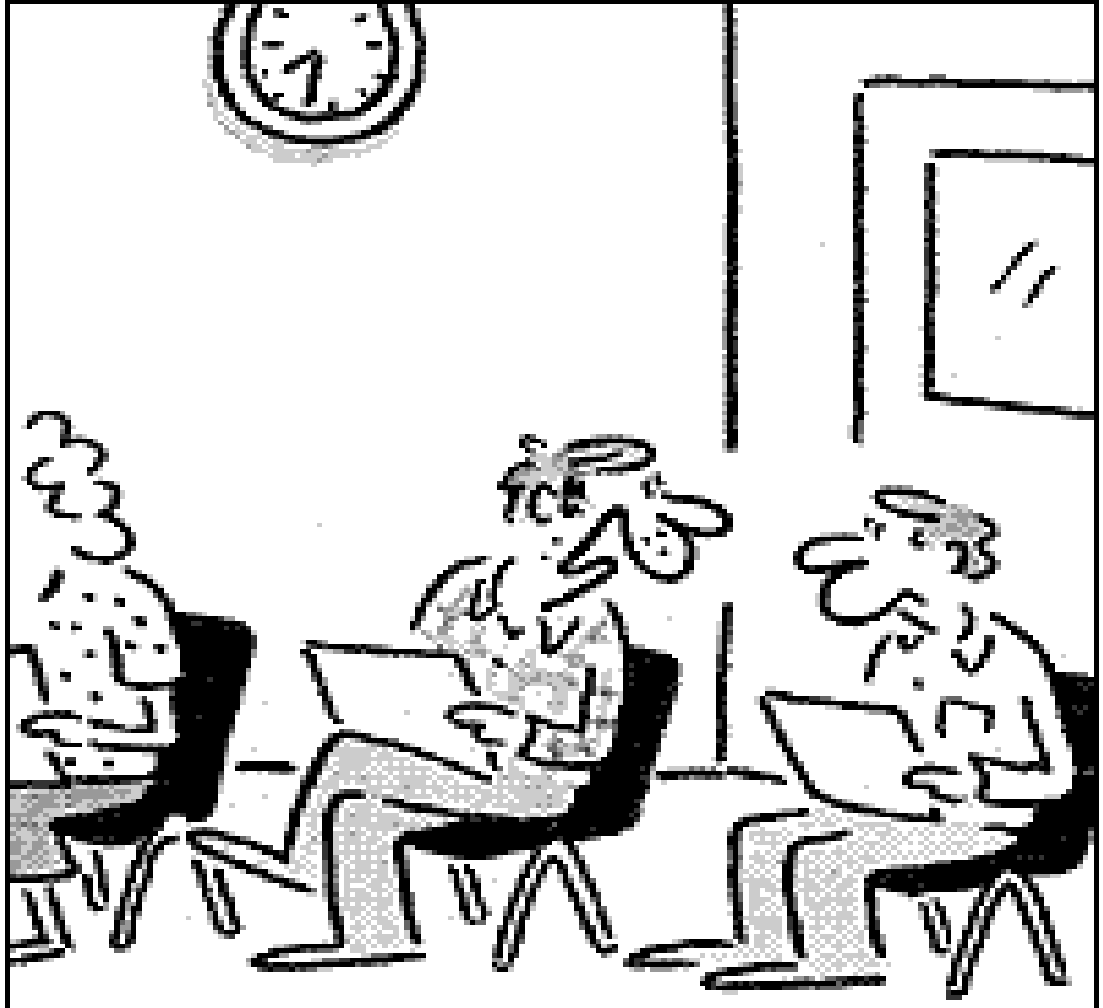
- Teen-brain friendly features of the 12-Step Model
  - abstinence
  - novelty – new approach to life
  - structure
  - spiritual component
  - fellowship

Brain Development: Opportunities for Treatment

- But…..elements of the 12-Step Model that challenging to the teenager
  - life-long disease
  - committing to life long changes
  - self-help groups may be not be teen friendly

Implications for Interventions

- Social/Environmental
- Self-regulation skills
- Counseling
- **Parenting**



'I attend as many parenting classes as I can - anything to get away from my children'

Working with Parents

P = **Promote** activities that capitalize on the strengths of the developing brain.

A = **Assist** children with challenges that require planning.

R = **Reinforce** their seeking advice from adults; teach decision making.

E = **Encourage** lifestyle that promotes good brain development.

N = **Never** underestimate the effects of drugs on the developir
emphasize the importance of drug-free lifestyle.

T = **Tolerate** the "oops" behaviors due to an immature brain.

Parent resources

- **Our research group has developed a parent presentation; e-mail me: winte001@umn.edu**

- **Excellent websites**
  - **Mentor Foundation**
  - **The Partnership at DrugFree.org**

Mentor

Prevention • Opportunity • Protection

www.mentorfoundation.org

Prevention Smart Parents

www.prevention-smart.org

THE PARTNERSHIP™ AT DRUGFREE.ORG

Prevent_Intervene_Get Treatment_Recover

www.drugfree.org

Parents Resource Center beta

Support, tools & tips from experts and parents like you

The Parents Resource Center provides advice and stories from parents and professionals about drug prevention, intervention and raising healthy teens.

Drug Guide

Search

The Partnership for a Drug-Free America™

UNDERSTANDING TEENS

A PARENT'S GUIDE TO THE **TEEN BRAIN**

Learn the mystery behind the developing teen brain, and what you can do to help your child avoid trouble.

Visit A Parent's Guide to the Teen Brain

PARENTING

The Parent Toolkit

Powerful tools and practical advice for parents to keep their kids healthy and safe.

Visit The Parent Toolkit

PARENT BLOG

Decoder FEATURED POSTS

Breaking down teen culture, substance abuse, and parenting. View Blog

Glamorizing Teen Pregnancy?

By Jessica Hoffman

"I'm baffled as to how Juno can now be criticized for "glamorizing" unplanned pregnancy and for spurring the Gloucester, MA pregnancy phenomenon."

My Favorite Player

By James Ponti

Texas Ranger and recovering addict Josh Hamilton is "making a brave attempt to right his life, conquer his demons and play his way back into the major leagues."

What's New

One of the most important roles a parent can play is air traffic controller. Just like an air traffic controller is the most trusted person the pilot relies on, the parent has to play a similar role and be their child's most trusted supporter and help guide them.

— Amelia Arria, Ph.D., senior research scientist, Treatment Research Institute

Read more about guiding your child

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